Idaho Department of Lands
Forest Health Alert

Douglas-fir tussock moth (*Orgyia pseudotsugata*) defoliation in Kootenai and Benewah Counties

Outbreak Alert

Douglas-fir tussock moth (DFTM) is a native insect that has periodic outbreaks in the Inland Northwest. It is a defoliating caterpillar that feeds on Douglas-fir, grand fir and spruce. Outbreaks usually occur every 8 to 12 years and last between 2 and 4 years. The last outbreak occurred between 2000 and 2002. In Idaho, outbreaks have occurred every decade since the 1940's. Between outbreaks, populations are kept at low levels by natural enemies such as predators, parasites and a naturally occurring virus disease.

Figure 2. Grand fir showing symptoms of Douglas-fir tussock moth feeding. Pupal case and egg masses can be found in lower crown

Figure 1. Douglas-fir tussock moth caterpillar on grand fir.

Current Status of Outbreak

Through use of the aerial survey, defoliation of forested areas has been observed in the Twin Lakes area adjacent to Highway 41, near Signal Point and Mica Peak south of Post Falls, and in the Plummer area on the Coeur d'Alene Indian Reservation (***Figure 4***). Most of the visible defoliation is occurring on grand fir, though caterpillars have also been observed feeding on Douglas-fir (especially near Twin Lakes). Approximately 2000 acres of defoliation has been observed in the Plummer area, while the Twin Lakes and Signal Point areas are experiencing approximately 800 and 6000 acres of defoliation respectively. The majority of the observed defoliation is light, with most trees being defoliated 30% or less. This is the second year of defoliation in some of these areas. Higher resolution maps are available on the IDL website (***See link on page 3***). Seeing aerially visible defoliation in forested settings this far north is unusual. Aerial surveys have not mapped significant Douglas-fir tussock moth defoliation in the Twin Lakes nor Post Falls areas since IDL has conducted aerial surveys. Adult moths can be detected in traps throughout north Idaho, but defoliation is usually only noted on ornamental trees north of the Coeur d'Alene Indian Reservation.

Signs and Symptoms

Douglas-fir tussock moth caterpillars reach 1 -¼ inch long and are covered with many hairs. Dense hairs arranged in 'tussocks' are found on the abdomen and are distinctive for this species (***Figure 1.***). Caterpillars feed on foliage from June through August and form cocoons in late July and August. Cocoons are found on foliage, tree trunks and branches and also on nearby structures (***Figure 2.***). Adult male moths are mottled grayish brown with feather-like antennae. Adult females are flightless, approximately ¾-1 inch long and rest on the outside of their cocoon. After mating, the female lays a frothy egg mass, covered with body hairs (***Figures 1&3.***).

Figure 3. Douglas-fir tussock adult Female (top) and adult male (bottom).

Silvicultural Options

In stands managed for timber production, favoring non-hosts (pines and western larch) will minimize damage from DFTM. Caterpillars will feed on these species, but only incidentally (***Figure 7***). Feeding damage is usually worst on drier sites, where pines are better suited. Defoliated trees may still be alive, so wait until the following spring after bud break to decide if a tree is dead before cutting it. Due to the recurring nature of DFTM outbreaks, silvicultural methods offer the best alternative for minimizing damage long-term. Douglas-fir and grand fir also have other forest health issues such as root disease which make them less desirable in many parts of northern Idaho.

Impact on Forests

During the last outbreak, over 140,000 acres were defoliated in 2001, with mortality occurring in some areas. Trees that are repeatedly defoliated can be killed outright or suffer top kill. Dry sites such as ridge tops and southerly aspects are particularly susceptible to defoliation, especially when grand fir or Douglas-fir makes up a significant proportion of the stand. Historically, damage in North Idaho forests has occurred in the Moscow Mountain area (south and east of Potlatch), in the McCroskey State Park area and on the Coeur d'Alene Indian Reservation. Defoliation during previous outbreaks was severe on some stands, and some mortality was observed. During the last outbreak in 2000-2002, defoliation was not observed north of Benewah County, with most of the damage to the south of Plummer.

Impact on People

Certain people are allergic to the hairs from DFTM caterpillars and cocoons. Symptoms are usually mild, with local skin irritation or rash the usual result. Minimize exposure to caterpillars and cocoons by wearing long sleeved shirts and washing with soap and water.

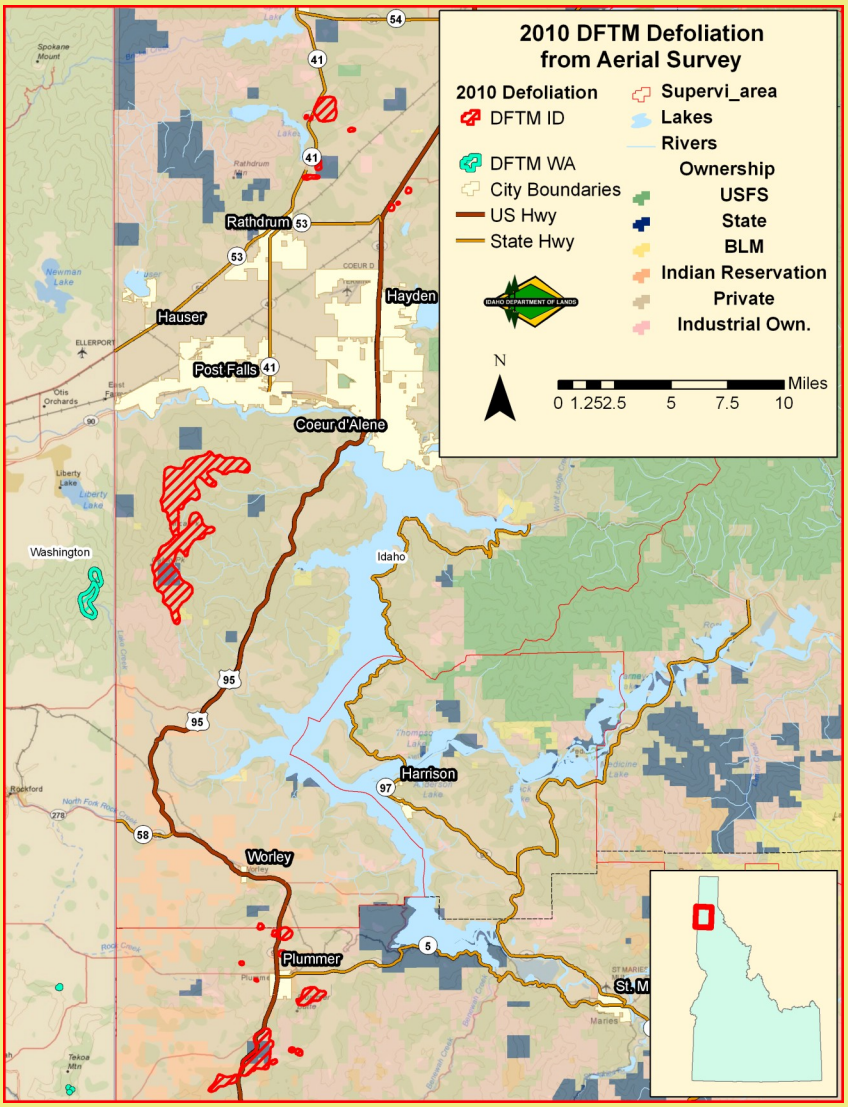

Figure 4. Douglas-fir tussock moth defoliation in Kootenai and Benewah Counties, August 2010.

Figure 5. Typical defoliation of in the Signal Point-Mica Peak area, August 2010.

Tree Mortality and Hosts

Tree mortality is related to the level of defoliation. Eggs hatch in early June and young caterpillars feed on new growth exclusively. As the caterpillars grow, they will feed on older needles and damage usually progresses from the top down (***Figure 5***). Heavy defoliation (>50%) is more likely to cause tree mortality. Trees further weakened by drought are especially susceptible. Young trees are more vulnerable to DFTM defoliation because they have proportionally more new growth, and if heavily defoliated, they usually experience higher mortality than mature trees. Repeated defoliation can cause death of the tree or result in top-kill. Trees can recover if defoliation is not severe, or not repeated for several seasons. Larger trees are often more susceptible to top-kill and attack from bark beetles such as the Douglas-fir beetle and fir engraver. Douglas-fir beetle and fir engraver mortality is common after DFTM outbreaks because DFTM feeding causes stress that can make the trees more susceptible to attack by these bark beetles. In the forest, most damage occurs on Douglas-fir (red fir) and grand fir (white fir). In ornamental situations, DFTM will also feed on Engelmann and blue spruce. Ornamental trees are often defoliated several years before outbreaks occur in forested situations. These "Sentinel Trees" cannot predict where outbreaks occur, but the same trees are often attacked repeatedly, and can indicate the onset of an outbreak. (***Figure 6***).

Control

Douglas-fir tussock moth outbreaks will subside on their own within 2-4 years. Natural factors such as weather, predators, parasites and limited food supplies usually cause the populations to collapse without human intervention. A naturally occurring virus disease usually kills large numbers of caterpillars late in the outbreak cycle. Labeled insecticides, both conventional and biological (*Bacillus thuringiensis*) are effective against DFTM in the short term, and have been used in the past. Because product labels and regulations change, please consult the label before applying any insecticide. *Always follow label directions*.

Figure 6. Grand fir "Sentinel Tree" near Potlatch Idaho showing defoliation in March (L) and July (R) 2010. This tree was also defoliated during the last outbreak during 2000-2002.

Figure 7. Defoliation of Douglas-fir and grand fir from the 2001 outbreak. The green trees are non-hosts (western larch and ponderosa pine).

For more information:

If you have questions about this information please contact Tom Eckberg, Lands Program Specialist-Forest Health, Idaho Department of Lands (208-666-8625; teckberg@idl.idaho.gov).

For more information visit the Idaho Department of Lands and U.S. Forest Service's Forest Health Protection websites:

http://www.idl.idaho.gov/bureau/ForestAssist/forest_health/foresthealth_index.html

http://www.fs.fed.us/r1-r4/spf/fhp/mgt_guide/tussock_moth/index.html

Surveys and Monitoring Program

The Idaho Department of Lands (IDL) and the US Forest Service conduct surveys annually to detect and monitor the DFTM populations in North Idaho. Aerial detection surveys (ADS) can detect the presence of defoliated trees and are useful for estimating the number of infested acres. Male moths are monitored through a system of pheromone trap sites throughout the Panhandle region of North Idaho (DFTM Early Warning System-EWS). The Idaho Department of Lands maintains a series of over 134 sites from the Potlatch area north to Coeur d'Alene, while the US Forest Service traps over 30 sites on Federal lands in the Clearwater and Nez Perce National Forests. When trap counts increase to a threshold of 20 male moths per trap, additional surveys for caterpillars and egg masses are conducted in these areas. Areas with high trap counts and supplemental surveys are likely to experience defoliation within one to two years.